

**Claims**

1 1. A method for regulating power of an output optical signal of an optical  
2 transmitter, said method comprising the steps of:

3 sensing optical energy proximate a back facet of said optical transmitter;

4 sensing thermal energy proximate said optical transmitter, wherein:

5 sensed thermal energy is indicative of a tracking error of said optical  
6 transmitter; and

7 said tracking error is indicative of a temperature difference between said  
8 back facet and a front facet of said optical transmitter and a change in  
9 coupling efficiency within said optical transmitter; and

10 regulating said power of said output optical signal in response to said sensed  
11 thermal energy and said sensed optical energy.

1 2. A method in accordance with claim 1, wherein said power of said output optical  
2 signal is regulated to be approximately constant for a predetermined range of temperature  
3 values of said sensed thermal energy.

1 3. A method in accordance with claim 1, wherein said optical transmitter is an  
2 uncooled optical transmitter.

1 4. A method in accordance with claim 1, further comprising:

2 providing a detected temperature signal indicative of temperature values of said  
3 sensed thermal energy to a temperature controlled variable resistor (TCVR),  
4 wherein:

5 resistance values of said TCVR correspond to respective temperature  
6 values of said sensed thermal energy; and

7 providing a temperature control signal indicative of a selected TCVR resistance  
8 value corresponding to a current temperature value of said sensed thermal energy  
9 for regulating said power of said output optical signal.

- 1 5. A method in accordance with claim 4, wherein said TCVR comprises:  
2 a plurality of TCVR resistance values, each TCVR resistance value corresponding  
3 to a respective range of sensed temperature values.
- 1 6. A method in accordance with claim 4, further comprising:  
2 determining values of said power of said output optical signal of said optical  
3 transmitter at predetermined temperature values;  
4 determining a respective temperature control resistance value for each  
5 predetermined temperature value to obtain a predetermined value of power of said  
6 output optical signal;  
7 interpolating said temperature control resistance values over a selected range of  
8 temperature values for obtaining said plurality of TCVR resistance values; and  
9 mapping each of said plurality of TCVR resistance values to a respective range of  
10 sensed temperature values.
- 1 7. A method in accordance with claim 6, wherein said predetermined temperature  
2 values comprise -40°C, 25°C, and 85°C.
- 1 8. An apparatus for regulating power of an output optical signal of an optical  
2 transmitter, said apparatus comprising:  
3 an optical sensing portion for sensing optical energy at a back facet of said optical  
4 transmitter;  
5 a thermal sensing portion for sensing thermal energy proximate said optical  
6 transmitter; and  
7 a power control portion for adjusting said power of said output optical signal  
8 responsive to said sensed optical energy and said sensed thermal energy, wherein:  
9 a temperature value of said sensed thermal energy is indicative of a  
10 tracking error of said optical transmitter.

1 9. An apparatus in accordance with claim 8, wherein said tracking error is indicative  
2 of:

3 a temperature difference between said back facet of said optical transmitter and a  
4 front facet of said optical transmitter; and

5 a change in coupling efficiency within said optical transmitter.

1 10. An apparatus in accordance with claim 8, wherein said optical transmitter is an  
2 uncooled optical transmitter.

1 11. An apparatus in accordance with claim 8, wherein said power of said output  
2 optical signal is regulated to be approximately constant for sensed temperature values  
3 within a predetermined range of temperature values of said sensed thermal energy.

1 12. An apparatus in accordance with claim 8, further comprising a temperature  
2 controlled variable resistor (TCVR) for receiving a temperature control signal indicative  
3 of temperature values of said sensed thermal energy, wherein:

4 said TCVR comprises a plurality of TCVR resistance values, each TCVR  
5 resistance value corresponding to a respective range of sensed temperature values.

1 13. A circuit for regulating power of an output optical signal of an optical transmitter,  
2 said circuit comprising:

3 said optical transmitter optically coupled to a photo diode;

4 said photo diode electrically coupled to said optical transmitter and electrically  
5 coupled to a temperature controlled variable resistor (TCVR);

6 a temperature sensor thermally coupled to said optical transmitter; and

7 said TCVR electrically coupled to said temperature sensor, wherein:

8 said output optical power is regulated to be approximately constant for a  
9 predetermined range of temperature values compensating for coupling  
10 efficiencies and temperature differences within said optical transmitter.

1 14. A circuit for regulating power of an output optical signal of an optical transmitter,  
2 said circuit comprising:

3 an optical transmitter configured to:

4 receive a composite control signal for regulating said output optical  
5 power;

6 provide an output optical signal having an output optical power value; and

7 provide back coupled optical energy,

8 a photo diode configured to:

9 detect a portion of said back coupled optical energy; and

10 and provide a photo diode control signal indicative of detected back  
11 coupled optical energy;

12 a temperature sensor configured to:

13 sense thermal energy proximate said optical transmitter; and

14 provide a detected temperature signal indicative of sensed thermal energy;

15 a temperature controlled variable resistor (TCVR) configured:

16 receive said detected temperature signal; and

17 provide a temperature control signal, wherein:

18 said composite control signal is indicative of a combination of said temperature  
19 control signal and said photo diode control signal.

1 15. A circuit in accordance with claim 14, wherein said power of said output optical  
2 signal is regulated to be approximately constant for a predetermined range of temperature  
3 values compensating for coupling efficiencies and temperature differences within said  
4 optical transmitter.

1 16. A circuit in accordance with claim 14, wherein said optical transmitter is an  
2 uncooled optical transmitter.

1 17. A circuit in accordance with claim 16, wherein said TCVR comprises a plurality  
2 of TCVR resistance values, each TCVR resistance value corresponding to a respective  
3 range of detected temperature values of said sensed thermal energy.

1 18. A circuit in accordance with claim 17, wherein said TCVR resistance values are  
2 interpolated from a set of pre-interpolated TCVR resistance values determined to obtain a  
3 predetermined value of optical output power.

1 19. A computer readable medium encoded with a computer program code for  
2 directing a processor to regulate power of an output optical signal of an optical  
3 transmitter, said program code comprising:

4 a first code segment for causing said processor to cause an optical sensor to sense  
5 optical energy proximate a back facet of said optical transmitter;

6 a second code segment for causing said processor to cause a thermal sensor to  
7 sense thermal energy proximate said optical transmitter, wherein:

8 sensed thermal energy is indicative of a tracking error of said optical  
9 transmitter; and

10 a third code segment for causing said processor to regulate said power of said  
11 output optical signal in response to said sensed thermal energy and said sensed  
12 optical energy.